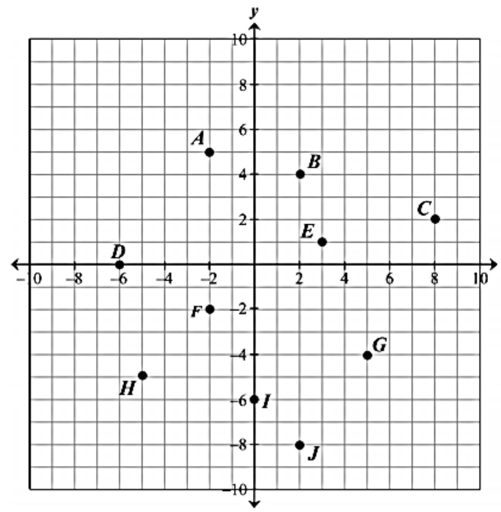
Name: ____________________________________

2.REV.6 – Systems of Inequalities Review

Past due on: _________ Period: ______

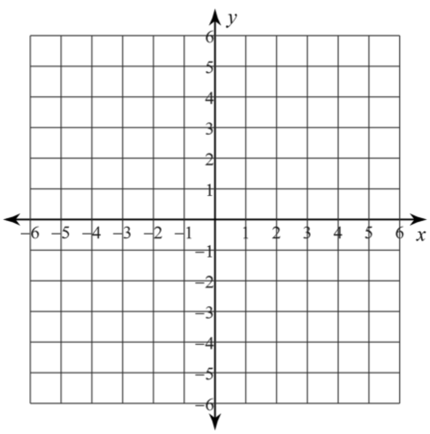
1. Given the system of inequalities shown below, identify ALL points that are solutions to this system.

$$x + y < 3$$
$$2x - y > 6$$

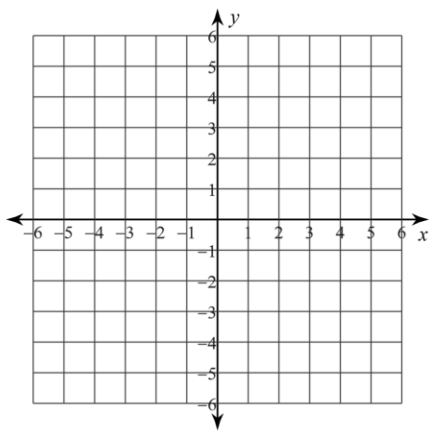


Graph the solution region of the system of linear inequalities.

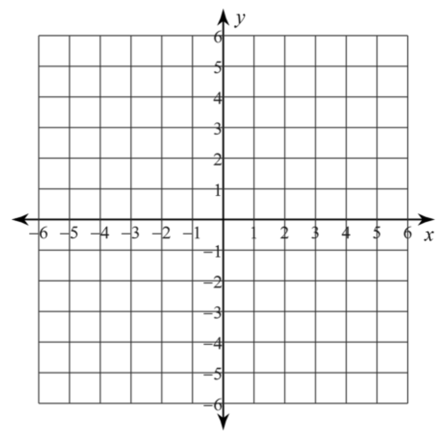
2. $y \le -x + 1$
   $x > -2$



3. $2x - 3y < -3$
   $x + 3y < -6$



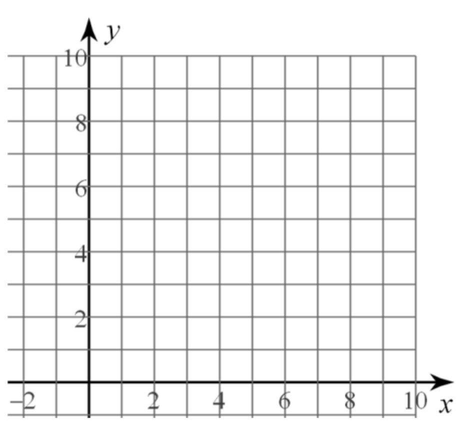
4. $2x - 4y \le 4$
   $x - 2y < 6$



5. Graph the system of linear inequalities. Name the coordinates of the vertices of the feasible region. Find the maximum and minimum values of the given function for this region.

$3x + 2y \le 20$
$x + 2y \le 12$
$x \ge 0$
$y \ge 1$

$f(x, y) = 5x + 10y$



(x, y)	$5x + 10y$

ALL GRAPHING FOR LINEAR PROGRAMMING PROBLEMS SHOULD BE DONE ON WWW.DESMOS.COM

For each of the following problems: (a) write a function to be minimized: $f(x, y)$; (b) write a system of inequalities: (c) graph on Desmos and then find the coordinates of the vertices of the feasible region and substitute them into the function from part a; (d) solve the problem.

6. Two oil refineries produce three grades of gasoline: A, B, and C.

   At each refinery, the three grades of gasoline are produced in a single operation in the following proportions: Refinery 1 produces 1 unit of A, 2 units of B, and 1 unit of C; Refinery 2 produces 1 unit of A, 4 units of B, and 4 units of C.

   A customer needs at least 95 units of A, at most 320 units of B, and at least 200 units of C.

   The customer would like to minimize his costs. For the production of one operation, Refinery 1 charges \$300 and Refinery 2 charges \$600. How should the orders be placed if the customer is to minimize cost? What is the cost?

   Let *x* = the units purchased from Refinery 1; *y* = units purchased from Refinery 2

   Write a system of equations & a function to be minimized

	x	y	TOTAL
A			
B			
C			
COST			$= f(x, y)$

   Find the coordinates & the vertices & evaluate:

(x, y)	$f(x, y)$

   Answer the problem:

7. On June 24, 1948, the former Soviet Union blocked all land and water routes through East Germany to Berlin. A gigantic airlift was organized using American and British planes to bring food, clothing, and other supplies to the more than 2 million people in West Berlin. The cargo capacity was 30,000 cubic feet for an American plane and 20,000 cubic feet for a British plane.

   To break the Soviet blockade, the Western Allies had to maximize cargo capacity but were subject to the following restrictions:

   - No more than 44 planes could be used.
   - The larger American planes required 16 personnel per flight, double that of the requirement for the British planes. The total number of personnel available could not exceed 512.
   - The cost of an American flight was \$9000 and the cost of a British flight was \$5000. Total weekly costs could not exceed \$300,000.

   Find the number of American and British planes that were used to maximize cargo capacity. What is that capacity?

   Let *x* = the number of American planes & *y* = the number British planes

   Write a system of equations & a function to be maximized

	x	y	TOTAL
PLANES			
PERSONNEL			
COST			
CARGO			$= f(x, y)$

   Find the coordinates & the vertices & evaluate:

(x, y)	$f(x, y)$

   Answer the problem: